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AUTHOR Rude, John C.
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ABSTRACT

Developed by the Telecommunications Committee of Chemeketa Community College (CCC), this report recommends the development of a telecommunications network to supply instruction by television, computers and telephone to homes, businesses, and CCC branch campuses. The report begins by stressing the advantages of a telecommunications network and its role in fulfilling CCC's mission. This section also analyses CCC's target audience, suggesting that a telecommunications network could both increase enrollment and meet the needs of a diverse student population. After the advantages of mediated instruction are listed, (e.g., interactivity; individualization; experience orientation; control over pacing, time, and sequence; and feedback), the objectives for the telecommunications network are stated. Part II presents the components of the proposed network and describes how the six methods of distributing media-based instruction (i.e., microwave, cable television, satellite down-links, low-power broadcast television, phone-net systems, and physical transport of software) can be integrated into a single network. Part III considers the implications of the recommended network and presents general recommendations concerning its operation. Appendices include budget details, proposed programming schedules, comparisons of mediated and classroom instruction, data on cable systems in the Chemeketa District, a sampling of currently available television courses, a proposed table of organization, and a District map. (LL)

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CHEMEKETA COMMUNITY COLLEGE

TELECOMMUNICATIONS NETWORK

A Proposal to the

Chemeketa Community College Board

May 18, 1983

John C. Rude

JC 830 453

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TELECOMMUNICATIONS COMMITTEE

Membership List

John Clyde, Counseling Department (Chairperson)

Jim Blodget, Production Supervisor, Audiovisual Services
Egon Bodtker, Director, Social Science/Food Service/ Early Childhood
John Briedwell, Coordinator, McMinnville Center
Tom Gill, Director, Humanities/Communications/Visual Communications
Keith Harker, Director, Learning Resources Center
Mary Neuendorf, Public Information Specialist, President's Office
Mike McNicholas, Instructor, Physical Science
Donna Reid, Lead Instructor, Telecommunications
John Rude, Planning & Development Specialist, President's Office (ex officio)

ABSTRACT

The Telecommunications Committee recommends a six-carrier network that will supply live and recorded instruction by television, computers and telephone, to homes, businesses and branches of the Chemeketa campus.

The proposed network will permit the college to increase acquisition, production, duplication and distribution of programming to reach new audiences and to meet the needs of existing students. The Committee recommends that the college try to reach at least 20% of its enrollment through mediated instruction. (This would represent a ten-fold increase over current levels of media-assisted learning.)

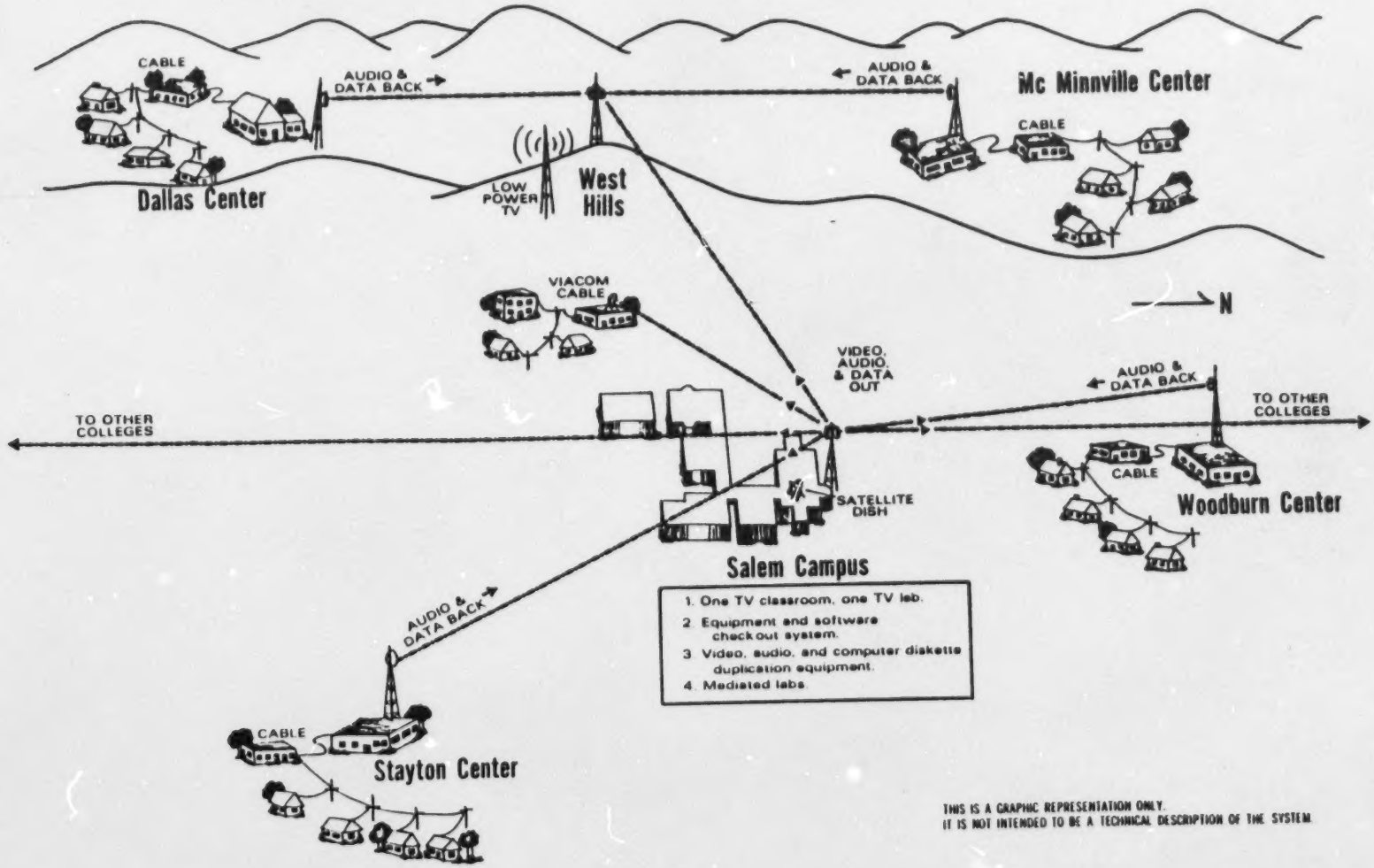
The rapid growth of information technology, and its wide acceptance by the general public, are the primary reasons why there will be an increase in demand for instruction by various media. No single technology can be viewed as "THE" educational solution, but the combined power of computers, television, satellite, microwave, cable, telephone and "stand-alone" software will produce profound changes in the learning process. In order for these changes to viewed as positive, the college must design instruction that maintains the excitement of human interaction, while exploiting the unique capacities of technology to individualize the pacing, content and presentation of material.

The proposed system will provide live and mediated instruction to outreach centers, worksites and homes, via microwave, cable television and low-power broadcast TV. Programming will be produced locally, acquired through Public Broacasting Service, satellite down-links, cable networks or direct-broadcast satellite, or distributed via software "packaging" -- video, audio, computer disk or teletext.

Some of the programs will be one-way, but emphasis will be placed on interactive (two-way) instruction. This will be achieved with a microwave system with two-way audio and one-way video capability that links the Salem campus of Chemeketa with outreach centers (and community cable systems) in Dallas, Stayton, McMinnville and Woodburn. Interactive learning will occur on a microcomputer network as well (transmitted also by microwave), and through telephone feedback to televised programs. Through these combined media, the network can reach 33,000 cable subscribers, individual computer owners, students attending outreach centers, viewers of low-power TV, and businesses wishing to participate in conferences, or receive upgrade training for employees at their place of employment.

The proposed system will cost $450,000 to build (using funds from the college serial levy), and approximately $600,000 annually to operate ($400,000 more than existing audio-visual services.) A three-year phase-in budget is proposed while the college is putting the components of the network in place.

PROPOSED
CHEMEKETA COMMUNITY COLLEGE
TELECOMMUNICATIONS NETWORK



THIS IS A GRAPHIC REPRESENTATION ONLY.
IT IS NOT INTENDED TO BE A TECHNICAL DESCRIPTION OF THE SYSTEM.

Telecommunications Report

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION 1: The purpose of the proposed network is to reach as many locations as possible with as many messages as possible.

RECOMMENDATION 2: Selection of hardware and software for new delivery systems should be determined by instructional needs.

RECOMMENDATION 3: Whenever possible, the college should choose inexpensive, low-technology systems over costly or complex alternatives.

RECOMMENDATION 4: Over the next five years, the college should prepare for a ten-fold increase in the proportion of its curriculum offered through mediated instruction.

RECOMMENDATION 5: The college should be equipped to provide live and mediated instruction, with two-way (interactive) and one-way capabilities, in a variety of configurations.

RECOMMENDATION 6: The college should adapt its support systems -- tutors, advisors, counselors, student activities, bookstore, etc. -- to the varied needs of several distribution systems.

RECOMMENDATION 7: The college should increase the duplication and distribution of software to all locations in the district.

RECOMMENDATION 8: The college should anticipate widespread use of low-cost, portable electronic equipment which can be made available on a large scale, directly to students and the general public.

RECOMMENDATION 9: Chemeketa should serve as a catalyst for developing a statewide distribution system of technical educational programming.

RECOMMENDATION 10: Chemeketa should establish instructional and management systems which encourage development of courses for distribution on the telecommunications network.

RECOMMENDATION 11: The Network should be phased-in over a three year peryod, culminating in full operation by Fall, 1985.

RECOMMENDATION 12: The Instructional Division should develop a programming schedule which transmits live, network and locally-produced video, as well as computer-based instructional materials.

CHEMEKETA TELECOMMUNICATIONS NETWORK

A Proposal to the Chemeketa Community College Board

Prepared by

The Telecommunications Committee
May 18,1963

Introduction

For the past seven months, the Telecommunications Committee has studied the potential of educational technology for Chemeketa. We have been seeking approaches which are:

(1) Cost-effective
(2) Consistent with the college's mission
(3) Supportive of a broad range of student and community needs, and
(4) Immediately accessible and realistic for the public served by the college

While emphasizing the practicality of the recommendations which follow, we must also indicate their far-reaching effects. The timing, location, content and supportive services of education will change as a consequence of using technology - virtually nothing will remain untouched.

We have tried to visualize the impact of technology on college operations, and design appropriate strategies to accommodate these changes.

The report compares various types of equipment and software, yet it places equal emphasis on the human factors -- the differences in learning styles, teaching strategies and enrollment patterns which follow the introduction of new technologies.

Organization of the Report

This report begins with a discussion of developments in educational technology, and why a telecommunications network would be of value (Part I).

Following this, we present the components of the proposed network (including the cost of equipment to be purchased with serial levy funds), and describe how six methods of distributing media-based instruction can be integrated into a single network (Part II).

Finally, we consider the implications of the recommended network and present general recommendations concerning its operation (Part III).

The narrative section of the report is followed by apppendices which include budget details, proposed programming schedules, and other pertinent data.

PART ONE

WHY DEVELOP A TELECOMMUNICATIONS NETWORK?

The advantages of telecommunications are derived from skillful use of media -- not wholesale acceptance of a single new technology, but instead, a careful balance of established and "state of the art" practices, in a dynamic, ever-changing mix.

In order to reach a variety of audiences with the flexibility we all desire,, Chemeketa must integrate two relatively new concepts into its operations:

(1) telecommunications -- transmission of information over distances through "carriers", which translate visual or symbolic messages into electronic signals, then restore them to their original forms.

(2) network -- a system of communication pathways which permits everyone using the system to function both as sender and receiver of messages.

A telecommunications network takes advantage of the fact that it is easier to move information than people. New audiences can be reached, new needs satisfied, through simultaneous transmission of information to multiple sites.

A network can be used to accomplish many purposes. The following are but a few examples of educational uses related to our recommendations.:

* Technological approaches can eliminate unnecessary duplication of effort. Lectures and demonstrations can be repeated time-after-time, even though the instructor makes only one presentation.

* Barriers of distance and isolation are eliminated. One instructor can teach simultaneously in several locations. Instruction can be offered directly to homes, businesses and isolated communities too distant for economical commuting.

* Students can control the timing and location of their learning. They can participate in "live" classroom activities, or work with recorded material in the comfort of their homes, at any time they choose.

* Routine and time-consuming tasks (such as maintaining class records, developing tests, and typing course outlines) are relegated to computers -- or sometimes eliminated altogether.

* Students enjoy a wider choice of approaches and strategies; for example:

  (1) "Instant replay" of performances;
  (2) Remote-broadcast "field trips" and interviews;
  (3) Simulation of costly or dangerous demonstrations;
  (4) Magnification of close-up or microscopic processes;
  (5) High-speed retrieval and reference services; and
  (6) Diagnostic drill and practice, based on individual rates of learning.

* High-quality instructional programs are made more accessible by the economies of scale inherent in distribution to "mass" audiences. At the same time, more individualized approaches are possible -- as programming becomes more abundant, it can be designed to meet a narrower spectrum of needs.

But these advantages are all merely theoretical, unless we can demonstrate that there is a need for the tools of technology in a particular situation. We are faced with possibilities which have never been fully tested, yet are too important to ignore. The tools we choose are ultimately determined by what, where, when, who and how we want to teach.

Fulfilling Chemeketa's Mission

Some of the answers to the "what...where...when" of teaching are supplied in Chemeketa's "Role and Mission" statement (Directions for a New Decade, November, 1982). The following excerpts support the detailed recommendations of this report:

"...the College is dedicated to providing educational opportunities that permit individuals of the area to enrich their lives, develop themselves personally and advance their careers to the limit of their desires and capabilities...."

"...by September, 1986, the college...will have available non-traditional methods for teaching and learning; i.e., other than lecture or traditional skills lab. Some areas to consider for implementation are computer-assisted instruction... telecommunications and short-term intensive training."

"...the mission of Chemeketa Community College is to offer instructional programs and other services which are community based, comprehensive, accessible and flexible..."

"...The institution will provide access to those residents who can benefit from instruction at the college....Where possible, barriers to potential students will be removed, and college services will be district-wide..."

"...The college will...provide classes at more locations and times convenient to students, and implement additional teaching methods to serve a greater variety of learning styles..."

"...This extension of offerings may require the use of a variety of traditional and non-traditional instructional delivery methods..."

"...By September, 1986, the college will have hardware, software and training/assistance to support computer assisted/managed instruction for 500 students per quarter, available at Salem campus and community centers throughout the district..."

"...The college will offer more LDC and voc prep classes...at times other than 7-5, Monday through Friday..."

Additional recommendations are included in the "Long Range Facilities Planning Task Force Report: 1982". These mission statements support the following policies:

1. The college should continue to provide a comprehensive mix of vocational, transfer and self-improvement courses, using the most effective methods of instruction available.

2. The geographical scope of instruction is the entire district, with special emphasis given to reaching isolated communities, businesses, and individuals.

3. The timing of instruction should be determined by student preferences and convenience, and should not be limited to conventional "business hours".

Identifying the Target Audience

The "who" of our analysis is somewhat more difficult to define, since the constituency of a community college is constantly shifting, and will change even more rapidly as learning becomes more accessible through technology.

Chemeketa's Spring, 1982 enrollment report to the State Department of Education suggests that there will be minor re-alignments over the next four years:

F.T.E. ENROLLMENT CHANGES, BY CATEGORY
1982 - 1986

Category	1982 FTE	1986 FTE	Percent Change
Lower Division Coll.	2606	3219	+23.52
Voc. Preparatory	2394	2964	+23.81
Voc. Supp./Apprent.	456	508	+11.40
Dev. Education	634	762	+20.19
Adult Self-Improv.	342	424	+23.98
Non-Reimb./Contract	342	593	+73.39
TOTAL:	6774	8470	+25.04

The annual growth rate (6.25%) and distribution among categories will be consistent with previous years, with the exception of non-reimbursable contract courses. These will experience a near-doubling in enrollments, but will remain a relatively small percent of the total.

It is difficult to project the college's enrollments against potential numbers served, since we don't know how many people cannot or will not attend Chemeketa, regardless of how courses are delivered. If we compare "headcount" enrollment (37,459 in 1980) with total district population between the ages of 18 and 75, we find that Chemeketa serves approximately 20% of its potential audience. About two-thirds of the 193,689 individuals in the 18-to-75 age span are working, yet many of these also seek training and education while they work. A study of Chemeketa's penetration by age group was completed in 1981; the highest participation rate was 46%, among district residents age 20-to-24.

How much penetration is possible in the "audience" currently unserved by Chemeketa's instructional program? If the college reached 20% of the employed population, and 50% of the unemployed, it would increase its current headcount enrollment by 46%, to more than 54,000. We believe that a telecommunications network could help Chemeketa achieve this goal within five years. In a period of ten years, the college's enrollment could easily double -- yet penetration of the total potential population would still fall short of 50%.

Quantitative predictions may be less significant than qualitative changes in an increasingly diverse student population. Some of the following trends are already occurring, or may be confidently predicted:

* Businesses increasingly demand training to upgrade skills of current employees -- especially to adapt to the computer revolution.

* The "baby boom" generation is approaching middle-age,

while K-12 populations will remain low until the mid-1990s. The "pool" of potential students is therefore older, more diverse, and increasingly interested in re-training or learning for personal enrichment.

* Economic recession has eliminated or curtailed many large-scale industrial enterprises, but it has given new lease to small businesses and individual entrepreneurs. The vast majority of new jobs are developing in firms which employ fewer than 20 people.

* Educational deficiencies cast a shadow on the futures of many adults. A 1979 Ford Foundation study found that 23 million Americans are functionally illiterate, and an equal number have serious reading problems. Their ability to find employment and contribute to the economic and social health of the community is entirely dependent on educational resources.

* Structural shifts in the economy continue to eliminate manufacturing jobs, at the same time creating new employment demands in the service and high-technology sectors. These shifts produce "displaced workers" who are highly motivated to seek re-training, or engage in entrepreneurial activity.

* The ethnic and linguistic composition of the district is changing, as a result of Asian refugee re-settlement and Hispanics leaving the migrant stream. The 1980 Census identifies 15,235 non-whites and 12,685 Spanish-speaking residents in the Chemeketa district. As members of these groups enter the economic mainstream, they will seek cross-cultural and bilingual training.

* Educational software is beginning to hit the home market. Future Computing, Inc. of Richardson, Texas predicts that 70% of educational programming will go directly into homes within 5 years. Telecommunications will be a $1 billion industry, growing at a compound annual rate of 71% during this period.

The implication of these trends is that the Chemeketa student body of the future will be a composite of:

(1) existing audiences (the young, the unemployed, the elderly) with <u>new needs</u>; and

(2) entirely new audiences (the time-bound and place-bound, those seeking re-training, short-term training and self-paced learning) who constitute <u>new markets</u> for the college.

Difficult as it is to pin-point the potential audience for new delivery systems, it is clear that there are large groups and diverse needs which Chemeketa must serve in order to keep pace with rising demands for educational services.

Teaching with Telecommunications

When we consider the "how" of teaching we are concerned with the qualitative differences between face-to-face and "mediated" instruction (i.e. computers, videotapes, audiotapes or other forms of "remote" learning.) Can these forms of technology perform some of the essential functions of the classroom teacher; e.g.:

> Help students set goals and objectives? Provide accurate information? Motivate students? Provide individual help? Facilitate discussion? Serve as a role model? Evaluate the progress of students?

Additionally, can mediated instruction offer a broad range of instructional content (vocational, college-transfer, enrichment courses, and short-term training), in a variety of modes (lecture, demonstration, tutorial, drill), in all of the requisite locations (central campus, outreach centers, work-sites and homes)?

The Committee reviewed these questions, as well as various potential uses of media for administration and community access. We concluded that mediated instruction or support functions are potentially useful in nearly every situation -- on campus, at outreach centers, at worksites and in homes.

Further, our research into the proposals for technological reform in higher education led us to the conclusion that mediated instruction is not only useful, but is actually preferable to unassisted classroom instruction in many situations. In the 1979 Millikan Lecture to the American Association of Physics Teachers, Dr. Alfred Bork, computer science specialist at the University of California at Irvine, identified specific deficiencies of the current system: boring textbooks, passive learning, inflexible pacing, and excessive emphasis on verbal skills (as opposed to manual or graphic demonstrations.) Dr. Bork then listed some of the advantages of mediated (in this case, computer-assisted) instruction:

* INTERACTIVITY - Students are participants, rather than spectators;

* INDIVIDUALIZATION - Learning experiences are designed to match the unique needs and desires of each student;

* EXPERIENCE-BASED - Students acquire insight, intuition and problem-solving ability through direct experience, rather

than secondary sources;

* CONTROL OVER PACING - Learning is structured to allow for variable pacing for students from different backgrounds.

* CONTROL OVER TIME AND SEQUENCE - Students are allowed to choose levels, entry and exit points, and times when they learn most efficiently

* CONTPOL OVER CONTENT - Different materials, approaches -- even languages -- are available to match a variety of student needs.

* FEEDBACK - Individual diagnoses permit all students to know how much they have learned, and what they need to learn in order to master a subject.

Objectives of a Telecommunications Network

In summary, a telecommunications network would: (1) serve existing and new audiences; (2) expand the college's role in the community; (3) fulfill Chemeketa's mission to provide comprehensive, accessible and flexible programs and services; (4) accelerate the transition to short-term training; and (5) improve the quality and effectiveness of learning. The network produces changes which are evolutionary, rather than revolutionary -- it extends the capacities of students and teachers, but does not replace the essential qualities of human interaction.

The components of the network are described in Part Two. To aid in the selection of these components, the committee has defined the following objectives for the Telecommunications Network:

OBJECTIVES

I. TO INCREASE INDIVIDUALIZED INSTRUCTION OPPORTUNITIES ON THE MAIN CAMPUS AND AT OUTREACH CENTERS.

II. TO PERMIT LIVE, TWO-WAY INSTRUCTION TO OCCUR AT MULTIPLE SITES, SIMULTANEOUSLY.

III. TO PROVIDE TRAINING AND INFORMATION RESOURCES DIRECTLY TO WORKSITES THROUGHOUT THE DISTRICT.

IV. TO PROVIDE LEARNING OPPORTUNITIES DIRECTLY TO HOMES THROUGHOUT THE DISTRICT.

PART TWO

DESCRIPTION OF THE PROPOSED SYSTEM

Chemeketa's proposed Telecommunications Network will include six "carriers" of electronic messages:

(1) Microwave
(2) Cable Television
(3) Satellite Down-links
(4) Low-Power Broadcast TV
(5) Phone-Net System
(6) Physical Transport of Software

These six carriers, operating together, constitute a "network" that features the following services:

1. Microwave links to the Chemeketa outreach centers, and to other colleges in the Willamette Valley.

2. Cable-TV "head-ends" (transmission sources) for 5 of the 16 cable systems in the district. (Some of the systems would be reached by microwave, others by cable.)

3. One large satellite dish on the main campus, and one portable dish.

4. A low-power TV station to reach homes and businesses not on cable -- and to supply programming to the other 11 cable systems in the district.

5. Interactive computer links by telephone lines and microwave, tying together the Salem campus, outreach centers, worksites and homes.

6. A classroom and laboratory specially equipped for live video origination.

7. Duplication equipment and services for videotapes, audiotapes and computer diskettes.

8. Check-out systems for equipment and software, and a software courier service to transport programs wherever it is impossible or inappropriate to transmit them electronically.

The following table details the components and costs of each carrier system.

* * * * * * * * * * *

COMPONENTS AND COSTS OF A TELECOMMUNICATIONS NETWORK

Microwave

2500 MHz transmitter, double-channel, 10 watt output	$20,700
Tower, omni-directional antenna, elliptical waveguide, connectors	24,800
50 watt linear amplifier	15,500
Receiver site equipment packages	8,000
Talk-back equipment, 4 sites	15,000
Antenna (4) with installation	10,000
Control room remodel & equipment	20,000
Studio transmitter link (2-channel)	30,000
Installation and supervision	25,000
TOTAL:	$169,000

Cable TV

Head-end modulators (5 @ $5,000 each)	$25,000
Automated playback equipment	15,000
TOTAL:	$ 40,000

Satellite Downlinks

16 ft. parabolic dish, main campus	$ 16,000
12 ft. dishes, McMinnville & "roving"	16,000
TOTAL:	$ 32,000

Low-Power Television

1 kilowatt (low-power) TV transmitter		$ 14,000
Antenna lease and installation		5,000
Production and maintenance equipment		12,000
TV-origination (1 lab, 1 classroom)		73,800
Cameras	4,400	
Microphones	2,400	
Projection TV (4)	32,000	
Switchers	12,000	
Recorders, lighting	21,000	
Remodeling costs	2,000	
TOTAL:		$104,800

Phone-Net System

Inward WATS System (800 Number)	Operating Budget
Bridge Connectors (Switching Equipment)	Operating Budget
Microcomputer components	5,000
Modems, data-base access, software	6,200
Printers	2,500
TOTAL:	$ 13,700

Software Distribution

Duplication equipment (audio, video)	$ 23,500
Playback equipment (campus, outreach)	34,500
Audio Visual Center remodel (Bldg. 2)	15,000
Cable, conduit to classrooms	7,500
TOTAL:	$ 80,500
GRAND TOTAL:	$450,000

* * * * * * * * * * *

MULTIPLE USE OF CARRIERS

To illustrate the flexibility of a network made up of these six carriers, we describe each one in turn -- emphasizing their capacity to accomplish the objectives of: (1) individualization; (2) long-distance interactivity; (3) applicability to worksite training; and (4) ability to reach directly into homes.

Microwave

Microwave is the ideal method of point-to-point communication with the college's outreach centers. Its capacity to carry many messages at once allows us to "narrowcast" educational programming for individuals who are on-site at the outreach centers, as well as to those who wish to review recorded material later. Due to its high capacity for data transmission, microwave communication also ties the outreach centers into the administrative resources of the college -- registration, budgeting, meetings, scheduling, etc. This will reduce transportation costs for students and staff, and expand the capability of outreach centers to serve their communities as fully as the Salem community is served by Chemeketa's main campus. The proposed system would carry 600 interactive transmissions (audio and data channels) simultaneously, and a single one-way video channel (with talk-back capability) from the main campus to outreach centers in Dallas, Stayton, McMinnville and Woodburn.

Cable Television

This medium is designed to reach individuals in their homes. There are approximately 33,000 subscribers on the 16 cable systems in the Chemeketa district; 33% of all households in the district are on cable. The system franchise in each community controls the content and delivery of public access programming. In order to make dedicated time for educational programming attractive to the operators, Chemeketa would have to originate programs in the larger communities (i.e. those which also receive point-to-point microwave transmissions.) The network would feed "head-end" amplifiers directly for these five systems, and would broadcast programming (via the low-power TV transmitter) to head-ends at the other 11 cable systems. (See Appendix B for listing of cable systems, channels, and penetration.)

Cable programming could be derived from several sources:
(1) re-broadcasts from satellite down-links (see next section);
(2) live or taped productions, prepared by Chemeketa staff or purchased through various consortia to which the college belongs;
(3) materials distributed to outreach centers on the microwave network, then taped for the head-end playback equipment;
(4) programs broadcast on Chemeketa's low-power TV channel, and taped for re-broadcast on the head-end. This diversity is needed to supply the 108 hours of programming per-week required to justify educational channels on the district's cable systems. (See Appendix C for a sample week-long schedule.)

Satellite Down-link

Satellite broadcasting is rapidly becoming the richest source of programming for educational institutions. Use of satellite parabolic antennae (commonly known as "dishes") would allow Chemeketa to receive Public Broadcasting programs directly, without paying re-transmission charges to Oregon Public Broadcasting. These charges (in 1982-83, $16,000) are scheduled for a 500% increase over the next five years.)

More importantly, satellite dishes would permit the college to receive programming beamed directly from space by 14 North American satellites hovering the equator in geosynchronous orbit. With more than 73 video services (ranging from the Disney channel to Repertory Theater) broadcasting 24 hours daily, the possibilities for individualized programming are almost limitless -- and expanding. Nationally, educational channels are providing courses directly to more than half a million cable subscribers.

We recommend purchase of a large dish at the central campus, and one small dish at the McMinnville center. As the other centers expand their facilities, they should incorporate the purchase of antennae (currently costing $8,000) in their construction budgets.

A third dish would be based at the Salem campus, but placed on a mobile platform. This unit would be used at outreach centers, worksite training, or other locations conducting short-term telecourses. The mobile unit could also be used to conduct or participate in conferences using satellite reception. By providing facilities for satellite conferencing, the college could generate income that would readily pay for the satellite downlinks.

Chemeketa would be one of many receivers of satellite broadcasts. Homeowners and businesses are investing in Direct Broadcast Satellite dishes (at costs of $200-$300) to enjoy the same variety of programming we are seeking. Many of these individuals or businesses would need college credit, and some form of supplemental instruction. By participating in the National College Satellite Consortium, and offering interactive, locally-oriented programming, Chemeketa would satisfy many of the educational needs of satellite viewers.

The college would have to pay licensing and rebroadcasting fees for some satellite programming. The Educational Coordinating Commission has recommended that licensing fees be shared by all colleges in Oregon. Chemeketa currently spends $16,000 annually on contracted telecourses, (most of which are transmitted by satellite), that are purchased jointly by community colleges. We are convinced that satellite programming will soon be the most economical means of acquiring quality educational programs. (See Appendix D, Sample of Current Telecourses.)

Low-Power TV

In 1981 the Board reviewed the benefits of "low-power" UHF television broadcasting, in connection with possible purchase of a tower in South Salem. After this option was eliminated, Chemeketa staff conducted additional feasibility studies, concluding that low-power TV still is the most energy-efficient and cost-effective method of reaching audiences at home with specialized instructional programs.

There are two barriers to implementation of low-power TV: (1) the FCC's reluctance to grant new licenses (they were flooded with applications after new rules were issued in October, 1980); and (2) lack of a suitable tower for locating the transmitting antenna. Purchase of transmitting equipment is therefore contingent on resolution of these problems. This may take several years, but the low-power TV transmitter is an essential component of the proposed network.

We recommend low-power TV because: (1) it is inexpensive to maintain a signal which would provide full programming to most of the Chemeketa district (see map, Appendix G); (2) it is the only

practical way to "feed" Chemeketa programming to the head-ends of 10 cable systems (in the Santiam canyon and West Polk County) which cannot receive it directly from the college; and (3) it will reach many homes which would not be served by any other carrier.

To produce local classroom broadcasts at reasonable cost, the college will need to modify two classrooms and install adequate receiving equipment on-campus and in the outreach centers. The classrooms will be functionally distinct (one equipped for lectures, the other for laboratory demonstrations) but the video equipment needs will be similar. Visual material will be presented on projection-TV screens that serve as "electronic blackboards". A third projector will be available for specialized uses at worksites, with large groups, or at outreach centers.

A control room will be needed to serve the multiple functions of: (1) amplifying TV signals; (2) sending them to the microwave and UHF transmitters; and (3) feeding the Salem cable system with modulated signals and pre-recorded or live programming. Additional production and maintenance equipment should be budgeted to provide mobility to productions, and to enable our own staff to repair equipment.

Phone-Net

The Phone-Net system currently links three classrooms on the main campus with any of the outreach centers (or all four simultaneously) with audio-only transmissions. Since students in receiving sites cannot see visual material at the sending site, this system has limited applications. We propose to use the Phone-Net with simultaneous transmission of one-way video or two-way computer messages. There would be no increase in line charges, and only minor equipment costs; hence, expanded use of the Phone-Net is cost-effective on either individual or classroom levels. Eventually, the college may purchase switching equipment which permits individual students to "conference" from their homes with an on-campus class, using live cable, broadcast or computer networks to supply visual material. The college should also explore the use of an "800" lease-line for teleconferencing, especially to businesses engaged in worksite training.

One immediate application of the Phone Net would be creation of a microcomputer network. To distribute microcomputer software, we will need to enhance existing equipment, and purchase "modems" (modulator-demodulators), software and printers. A microcomputer network will be an important supplement to telecourses, Phone-Net, and inter-office communications between the Salem campus and outreach centers. Using either telephone or microwave lines, the network would permit students to interact with the instructor during classes, or to leave messages (or other work) for comment at the instructor's convenience. Students and staff could use the telephone-microcomputer links to gain access to large data bases

(such as The Source, and CompuServe) that would fulfill a variety of instructional purposes.

Software Distribution

Physical transportation of recorded software offers flexibility that is not possible with any of the other carriers. With microwave, cable, satellite, telephone and low-power TV systems we are limited to one program per channel. A software distribution system allws many different programs to be used simultaneously, at many different locations.

To accomodate the increased use of individually-oriented recorded material, the college will need to purchase duplicating equipment to replace antiquated audio machines. Because of the anticipated increase in demand for recorded programming of all types, the college will have to begin systematic production of video and computer diskette copies.

Chemeketa will also need to expand its inventory of "check-out" equipment to include video-playback machines and small computers. Eventually, we recommend that the college purchase a mobile van containing "hands-on" vocational equipment (e.g. electronic bench-repair kits and computer terminals) to serve outlying communities. This method of delivery, supported by the college's operating budget, would be most effective after the Telecommunications Network is operational. Expanded student and staff access to software will also require remodeled space in the Audio-Visual Center in Building 2.

PART THREE

RECOMMENDATIONS

RECOMMENDATION 1: The purpose of the proposed network is to reach as many locations as possible with as many messages as possible.

The entire field of communications is involved in a transition from "broadcasting" (reaching mass audiences with broad-based programming) to "narrowcasting" (reaching small audiences or individuals with special-appeal programming.) Community colleges can no longer target their programs toward a "typical" student; there are as many different audiences as there are individuals with specific learning needs to be met. Since these individuals are scattered throughout a 2,800 square-mile district, Chemeketa needs multiple (even, at times, redundant) carriers to reach a wide variety of audiences.

RECOMMENDATION 2: Selection of hardware and software for new delivery systems should be determined by instructional needs.

Improvements in technology should be used to fulfill Chemeketa's basic purpose: teaching. Many other goals (for example, entertainment, marketing, indoctrination) can be pursued effectively through media, but they would be tangential to the college's mission. It is important not only to select equipment and programming which enhances teaching, but also to place the responsibilities regarding acquisition, production and distribution of programs directly into the hands of instructors. The equipment described in Part Two will augment Chemeketa's instructional program only if the Chemeketa staff faces the challenge of using the network in its routine tasks of teaching, advising, counseling and administrative support.

RECOMMENDATION 3: Whenever possible, the college should choose inexpensive, low-technology systems over costly or complex alternatives.

Many techniques and levels of quality are available to the college as it selects equipment for its network. Chemeketa's experience with computer-based and audio-visual instruction suggests that simple, accessible technology is adopted more readily by our staff than "high-tech" solutions. In our recommendations, we have tried to avoid telecommunications systems that are impersonal, difficult to learn, or accessible only with the assistance of **experts**. Adaptation of "state of the art" technology may occur gradually, but it should proceed with a clear plan of progression from simple to complex.

RECOMMENDATION 4: Over the next five years, the college should prepare for a ten-fold increase in the proportion of its curriculum offered through mediated ynstruc|ion.

Currently, Chemeketa offers ten televised courses (enrolling 194 students, Winter, 1983) and 5 Phone-Net courses (16 outreach students, Winter, 1983.) Also, during Spring Term the college began offering credit and non-credit vocational instruction on Salem's Viacom cable system (Channel 19). The number of viewers watching these programs has not yet been tabulated.

Despite this rapid growth in the use of mediated instruction, we anticipate even wider demand for telecourses, live broadcasts, and other types of interactive media. A clear plan for strengthening the college's role in media-based education would include specific targets -- e.g. the offering of 20% of vocational and transfer courses through televised, computer-network, or other mediated methods. This goal, when achieved, will result in 1,400 students using the proposed network (most of whom have not been previously served by the college.) This would represent a ten-fold increase over current direct, media-based instruction. In the absence of such increases in services, other suppliers, such as Control Data Corporation, I.T.T. and C.B.S. will move rapidly toward direct marketing of educational services.

Some of the programming required for Chemeketa's expansion can be supplied by satellites, college consortia, Public Broadcasting Service (etc.) Locally-originated programs, however, will have to be produced in our existing studio, or in the proposed televised classrooms.

RECOMMENDATION 5: The college should be equipped to provide live and mediated instruction, with two-way (interactive) and one-way capabilities, in a variety of configurations.

There will always be situations where live, classroom-based interaction is preferable to any form of mediated instruction. Generally, interactive communication (by means of computers, telephone lines, or computer-assisted video) will be preferable to one-way methods, such as broadcast or cable. Efficient learning requires immediate repetition, questioning, diagnosis, and feedback. We can provide this immediacy in several different ways:

1. With microwave, we can supply one-way video and two-way audio to outreach centers or worksites (or we can use Phone-Net leased lines to supply audio interaction.)

2. With cable "narrowcasting" or low-power TV broadcasting, we can supply one-way audio and visual material, with the possibility of interaction from worksites or home via telephone call-back (similar to Phone-Net).

3. With telephone lines or microwave links, we can supply interactive computer programming to any student equipped with a computer, modem and telecommunications software (again, located at home, outreach center, or worksite).

4. With data transmission links (microwave or telephone) to computers with specially-prepared video programming, we can provide computer-assisted video instruction which allows students complete control over pacing, content selection, and reinforcement.

Eventually, cable TV will be capable of two-way transmissions, but cable systems in the Chemeketa district are, (with only four exceptions), one-way systems. "Linear" media (such as films and slide-tapes) will continue to play an important role in enriching classroom instruction. The challenge for educational planners is not how to select the "best" system, but how to combine all the various media to effectively meet the learning needs of students.

RECOMMENDATION 6: The college should adapt its support systems -- tutors, advisors, counselors, student activities, bookstore, etc. -- to the varied needs of several distribution systems.

Students who participate in mediated instruction need more -- not less -- of the personalized support provided to on-campus students. The experience of the British Open University and other large-scale programs indicates that face-to-face encounters (even those not directly related to instruction) are essential in cementing the student's commitment to independent, individualized learning.

Support staff will find more time for personal interactions as they take advantage of network communications, though such means as:

1. Allowing students to register at their convenience, as soon as they have made course decisions.

2. Combining admissions and registration in a single process, and holding registration periods open longer to accomodate individualized schedules.

3. Providing data-base information for book purchases, library holdings, course outlines (etc.) to any student who has access to a phone-modem, in his home or at an outreach center.

4. Offering pre-recorded or live "how-to" assistance via telephone or microwave; distributing placement tests, career planning guides, and orientation information via

interactive microcomputer networks.

5. Establishing "bulletin-board" and electronic communication among outreach centers and the main campus for catalog or schedule changes, student advising, charge-card payments, CCRLS messages, etc.

RECOMMENDATION 7: The college should increase the duplication and distribution of software to all locations in the district.

Instructional programs currently use software almost exclusively for supplemental purposes. During 1981-82 instructors rented over 1,000 films at a cost of $19,892, and added 20 films and 30 slide-tape programs to the college's collection. Approximately $6,750 was expended for microcomputer software during the same period (when the number of computers owned by the college increased from 6 to 65.)

We anticipate a rapid transition to integrated use of media, with instructional roles focusing on individual, diagnostic work with students. This transition implies greatly expanded demand for duplicate videotapes, audiotapes and computer disks, as well as careful coordination and scheduling. This will require the college to upgrade its existing playback and duplication equipment to accomodate the software needs of individual students.

RECOMMENDATION 8: The college should anticipate widespread use of low-cost, portable electronic equipment which can be made available on a large scale, directly to students and the general public.

Increasing availability of low-cost microprocessors will result in equipment portability of unimagined dimensions and types. While we cannot predict the timing or exact nature of these technological improvements, we believe that the community college of the 1990s should become a primary source of hands-on access to "high technology" for the general public. For Chemeketa, this will take the form of mobile vans with vocational laboratories and computers, or distribution of video programming and hand-held computers through the CCRLS system. These items are excluded from this proposal, but the rapid pace of change requires that they be carefully considered now for possible inclusion in the college operating budget.

RECOMMENDATION 9: Chemeketa should serve as a catalyst for developing a statewide distribution system of technical educational programming.

After it acquires microwave equipment, Chemeketa will be able to exchange programming directly with other community colleges in the Willamette Valley (see Schematic, page #). The Western Oregon Regional Telecommunications (WORT) Consortium, under the

leadership of Lane Community College, distributes video programming to five colleges, and will soon link participating colleges into a microcomputer network. By 1987, the WORT Consortium will be capable of microwave networking, not only to member institutions, but to other colleges throughout the Northwest. When a sufficient quantity of programming is available, participating colleges (including major universities in the region) will originate transmissions through satellite up-links. Chemeketa would be the logical site for such an origination point, financed by all the participating institutions. This "accident" of geography places additional responsibility on Chemeketa to develop a long-range, comprehensive plan for leadership in educational technology.

RECOMMENDATION 10: Chemeketa should establish instructional and management systems which encourage development of courses for distribution on the telecommunications network.

Dr. John Strange, keynote speaker at Chemeketa's Fall, 1982 Inservice ("The First Byte") noted that full utilization of technology implies a redistribution of resources. Instead of channeling information through one instructor to a classroom of students, a fully-functioning network will channel information to individual students through the combined efforts of teams of instructors, managers and technicians.

We propose that specific courses or productions be developed by temporary "cadres" organized along the following lines:

1. Instructor(s) -- originate the idea and serve as producer until the product is ready for delivery.

2. Production specialists -- provide expertise in learning theory, engineering, photography, graphic arts, computer programming, script-writing, etc.

3. Operations specialists -- provide expertise in marketing, continuity, scheduling, acquisitions, instructional support.

Cadres would be formed to accomplish a variety of tasks: e.g.

(1) initiate and follow-through on a recorded production;

(2) assist in producing live broadcasts to outreach centers and cable head-ends;

(3) acquire network productions from consortia, and plan supplemental instructional programming;

(4) arrange teleconferencing by satellite or phone-net.

The duration of assignments would be determined by the size of the

project. Instructional staff who participate in the cadre projects (estimated at approximately 20 per year) should be compensated by release-time (averaging 20% of the normal teaching load.)

To allow these units to function effectively, six permanent staff members must be hired to augment the existing Audio-Visual specialists assigned to the Learning Resource Center. In addition, the Instructional Division should designate a full-time "Coordinator" of the network, and provide 20% release-time to five instructors who will provide assistance in a number of areas:

Research	Promotion
Evaluation	Needs Assessment
Planning	Consortium Liaison
Scheduling	Budgeting

We believe that it is imperative to place the initiative for programming in the hands of instructors, in much the same manner as the National Science Foundation project is managed by instructional staff. Both the Network Coordinator and the coordinator of Media Services will report to Directors in their respective divisions.

The proposed Organization Table of the Network (including new and existing positions) is described in Appendix E. A detailed, three-year "phase-in" operational budget appears in Appendix F.

RECOMMENDATION 11: The Network should be phased-in over a three year period, culminating in full operation by Fall, 1985.

We recommend the following installation schedule, which takes into account the budgetary and technical factors involved in the installation of the proposed system:

September, 1983 - Prepare bid specifications on microwave, cable head-end, satellite, microcomputer and duplication/playback equipment.

September, 1983 - Hire technician, submit FCC application for Low-Power TV license.

December, 1983 - Open bids, order equipment

December, 1983 - Hire Network Coordinator

March, 1984 - Designate part-time Instructor/Coordinators; begin planning Fall programming schedule.

July, 1984 - Complete installation of microwave system, large satellite dish, cable head-ends

and microcomputer network

July, 1984 - Hire rest of full-time staff for Media Services and Instructional Division.

August, 1984 - Remodel 2 TV classrooms

September, 1984 - Complete programming schedule for 1984-85

December, 1984 - Prepare bid specifications for Low-Power TV equipment (assuming FCC application approved)

July, 1985 - Install Low-Power transmitter and antenna, second satellite dish, and modification of microwave system

September, 1985 - Complete Programming schedule for 1985-86; Network fully operational.

RECOMMENDATION 12: The Instructional Division should develop a programming schedule which transmits live, locally-produced and network video, as well as computer-based instructional materials.

Over 100 telecourses are currently available at costs averaging $250 to $500 per school year (see Appendix D for a sample of these offerings). By the time Chemeketa's network is fully operational, at least three times as many courses will be available. Some will be free; others will be expensive (and exceptionally high in quality). Telecourses, videotapes, diskettes and other media will be available to Chemeketa through joint-leasing agreements with other colleges.

The curricular problem facing Chemeketa is not the location of appropriate programming, but the selection of materials from an increasingly large pool. This will require careful examination of existing courses, anticipation of new markets (such as short-term vocational training) and re-design of support services to provide maximum interaction between teachers and students.

Programming will fall into several categories, e.g.:

Live Broadcasting: Courses, single classes, demonstrations, guest speakers, internal staff meetings, teleconferences.

Chemeketa Productions: Classes, demonstrations, field trips, guest speakers, computer-assisted instruction, community-access cable programs.

Outside Productions: Public Broadcasting, satellite, direct-broadcast satellite, software packages (singly or in combination -- films, audiotapes, computer programs, etc.), cable

and teletext.

A sample programming schedule, (104 hours in a "typical" week), is presented in Appendix C. Clearly, selection of an appropriate program mix is a complex task, requiring broad participation of the entire college staff. The process should begin as soon as the Board approves this proposal.

CONCLUSION

Inevitably, some will view this proposal as over-ambitious -- at best a risky experiment with scarce public funds. After reviewing the revolutionary changes on the horizon, we are concerned that we have not been bold enough in responding to the "explosion" of telecommunication methods available to us now.

The proposed network is not a "turn-key system". It could, however, provide a framework for rapid response to the many unpredictable changes that will occur in the field of educational technology.

The question is not whether education will undergo rapid, dramatic change as a result of the confluence of computers, video and data transmission technologies. The question is who will serve the large, diverse and discriminating audience with interactive programs? If the community colleges are not on the scene, with appropriate equipment and talented production teams, there will be other aggressive competitors, eager to carve up our traditional markets.

We must continue to do what we do best: offer quality vocational instruction, transfer courses and self-improvement instruction geared to the specific needs of our district residents. But we cannot continue doing it in the same manner, without threatening our survival. We are convinced that community colleges are not destined to become superfluous; that they are uniquely responsive to the desires and needs of the communities that support them. The communication channels may change, but the message will remain the same: high-quality instruction, public service, and flexible, rapid response to the needs of the community.

APPENDIX A

COMPARISON OF MEDIATED AND DIRECT INTERACTION

KEY

m = Media Preferred
M = Media Essential
i = Interaction Preferred
I = Interaction Essential

Comparison Category / Location Category

INSTRUCTIONAL CONTENT	CAMPUS	OUT-REACH	WORK-SITE	HOME
Vocational Preparatory	i,m	m	m	M
Lower Division Transfer	i,m	i,m	m	M
Developmental Education	i,m	m	m	M
Short-term Training	i,m	i,m	m	M
Personal Enrichment	m	m	m	M
INSTRUCTIONAL ROLE	**CAMPUS**	**OUTR.**	**WORK**	**HOME**
Convey Information	i,m	i,m	m	M
Motivate Students	i	i	m	M
Provide Individual Help	m	m	m	M
Evaluate/Monitor Progress	m	m	m	M
Define Goals/Objectives	i	i	m	M
Facilitate Discussion	i,m	i,m	m	M
Serve as Role Model	I	I	i	i
INSTRUCTIONAL METHOD	**CAMPUS**	**OUTR.**	**WORK**	**HOME**
Lectures	i,m	i,m	m	M
Demonstrations	i,m	i,m	m	M
Drill and Practice	m	m	M	M
Discussion/Seminar	i,m	i,m	i,m	i,m
Tutorial	i,m	i,m	m	M
Testing	m	m	m	M
Independent Study	m	m	M	M
Simulation	m	m	M	M
INSTRUCTIONAL SUPPORT	**CAMPUS**	**OUTR.**	**WORK**	**HOME**
Reference/Research	m	M	M	M
Counseling/Advising	i,m	i,m	m	M
Admissions/Registration	m	m	M	M
Financial Aid	i,m	i,m	m	M
Transcripts, Records	m	m	M	M
ADMINISTRATIVE SUPPORT	**CAMPUS**	**OUTR.**	**WORK**	**HOME**
Inservice Training	m	M	-	M
Committee Meetings/Conf.	i,m	m	i,m	M
College Promotion	m	m	M	M
Information, Schedules	m	m	M	M
OTHER USES	**CAMPUS**	**OUTR.**	**WORK**	**HOME**
Student Activities	i,m	i,m	M	M
Outside Agency Use	i,m	i,m	i,m	M
Community Access	m	M	M	M

*Indicates information supplied by company

CABLE SYSTEMS IN THE CHEMEKETA DISTRICT

COMMUNITY	AREA COVERED	HEAD END	(Passby) NUMBER HOUSEHOLDS POSSIBLE	NUMBER SUBSCRIBERS	PERCENT PENETRATION	NUMBER CHANNELS PROGRAMMED	NUMBER CHANNELS SYSTEM CAPABILITY	UPSTREAM CAPABILITY	COMPANY/ MANAGER
Salem	Salem Urban Growth Boundary	Salem	49,000*	22,600*	47%	22	30		Viacom/Bret Rios
Detroit	Detroit/Idanha	Detroit	300	300*	100%* (permanent res.)	9	12		Santiam Cablevision/ Orval Brown
Upper Santiam Valley (Lyons, Mehama, Mill City, Gates)	Lyons/Mehama to Niagra	Mehama	1,450	1,300*	90%*	9	12		Santiam Cablevision/ Orval Brown
Stayton	Stayton City Limits	Stayton	1,550	700*	45%*	16	35		Santiam Cablevision/ Orval Brown
Sublimity/ Aumsville	Sublimity/Aumsville City Limits	Sublimity	1,117*	380*	34%	16			Stayton Telephone/ Cheryl Fowler
Turner	Turner City Limits	Turner	400	200*	50%*	9	12		Santiam Cablevision/ Orval Brown
Jefferson	Jefferson City Limits plus two miles	Jefferson	811	495*	61%*	12 (40 possible)	12	yes	Mid-Willamette/ Cablevision Greg Bloom
Monmouth/ Independence	Monmouth/Independence City Limits	Monmouth	4,000	2,000*	50%-55%*	12	12 (35 soon)		Oregon Cablevision/ Larry Johnson

*Indicates information supplied by community

COMMUNITY	AREA COVERED	HEAD END	(Passby) NUMBER HOUSEHOLDS POSSIBLE	NUMBER SUBSCRIBERS	PERCENT PENETRATION	NUMBER CHANNELS PROGRAMMED	NUMBER CHANNELS SYSTEM CAPABILITY	UPSTREAM CAPABILITY	COMPANY/ MANAGER
Dallas	Dallas City Limits	Dallas	3,300	2,000*	60%	12	12 (25 soon)		Oregon Cablevision/ Larry Johnson
Falls City	City Limits plus one mile	Falls City	318	175*	55%*	8	12		Good Cable/ Tom Goodall
Valsetz	City Limits	Valsetz	85	60*	70%*	8	12		Good Cable/ Tom Goodall
Sheridan	Sheridan/Willamina and trunk between	Sheridan	1,530	1,300*	85%*	12	12 (30 soon)		Struck Electric/ Don Struck
McMinnville	McMinnville City Limits	McMinnville (not yet in operation)	6,000* (est.)	2,700 (est)	45%* (target)	40 (at opening)	60	yes	Liberty Cable/ Rick Schaal (Newberg)
Dayton, Lafayette, Dundee	Communities plus trunks between	Dayton	(Extension of Newberg system)		45%	40	60	yes	Liberty Cable/ Rick Schaal
Woodburn	Woodburn, Gervais, Hubbard and trunks between	Woodburn (new system)	1,750 (7,000 by end of 1983)	700* (2800 by end of 1983)	40%*	26	58	yes	Northland Cable/ Robert Blake
Silverton	City Limits	Silverton	1,800*	540	30%*	17	35	yes	Abiqua Cablevision/ Stu Rasmussen
Mt. Angel	City Limits	Silverton	850*	255	30%*	17	35	yes	Abiqua Cablevision/ Stu Rasmussen
TOTALS			74,261	35,705	48%				

APPENDIX C

CHEMEKETA TELECOMMUNICATIONS NETWORK

Sample Programming Schedule

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
6:00	OCEANUS (Repeat)	ART OF BEING HUMAN	UNDERSTANDING HUMAN BEHAVIOR	FOCUS ON SOCIETY	IT'S EVERYBODY'S BUSINESS	INTRODUCTION TO PSYCHOLOGY (1)	MAKING IT COUNT (Repeat)
7:00	USING PERSONAL COMPUTERS (Repeat)	SECOND CENTURY	AMERICAN GOVERNMENT SURVEY	PERSONAL FINANCE	MAKING IT COUNT	BUSINESS OF MANAGEMENT	QUALITY OF WORK LIFE (Repeat)
8:00	IT'S EVERYBODY'S BUSINESS (Repeat)	VARIETIES OF MAN AND SOCIETY	VARIETIES OF MAN AND SOCIETY	PEACE AND CONFLICT	CHANGING LIFE ON EARTH (1)	CHANGING LIFE ON EARTH (2)	HOME GARDENER (Repeat)
9:00	ENERGY, TECHNOLOGY AND SOCIETY (Repeat)	ESSENTIALS OF WRITING	ESSENTIALS OF WRITING	ESSENTIALS OF WRITING	ESSENTIALS OF WRITING	ESSENTIALS OF WRITING	USING PERSONAL COMPUTERS (Repeat)
9:30		WORK AND SOCIETY	WORK AND SOCIETY	WORK AND SOCIETY	WORK AND SOCIETY	WORK AND SOCIETY	
10:00		ENERGY, TECHNOLOGY AND SOCIETY	ENERGY, TECHNOLOGY AND SOCIETY	ENERGY, TECHNOLOGY AND SOCIETY	ENERGY, TECHNOLOGY AND SOCIETY	ENERGY, TECHNOLOGY AND SOCIETY	
10:30		BUSINESS ENGLISH	BUSINESS ENGLISH	BUSINESS ENGLISH	BUSINESS ENGLISH	BUSINESS ENGLISH	
11:00		QUALITY OF WORKLIFE	ETHNIC AMERICA (1)	LABOR ISSUES	ETHNIC AMERICA (2)	USING PERSONAL COMPUTERS	
11:30	THE CREATION OF ART						
12:00	SHAKESPEARE PLAYS	CABLE AS EDUCATIONAL MEDIA	INTRODUCTION TO AGING	BASIC ELECTRICITY	HEALTH ISSUES	FRONTIERS IN CHEMISTRY	CHANGING LIFE ON EARTH (Repeat)
12:30		INTERNATIONAL AND DOMESTIC CONFLICT	INTERNATIONAL AND DOMESTIC CONFLICT	INTERNATIONAL AND DOMESTIC CONFLICT	INTERNATIONAL AND DOMESTIC CONFLICT	INTERNATIONAL AND DOMESTIC CONFLICT	
1:00		SHORT-TERM VOCATIONAL TRAINING	WOMEN'S STUDIES	WOMEN'S STUDIES	WOMEN'S STUDIES	WOMEN'S STUDIES	
1:30			BASIC ELECTRICITY (Repeat)	JAPAN	COLOR BARS	INTRODUCTION TO PSYCHOLOGY (2)	
2:30	PATTERNS OF REBIRTH		HISTORY OF FILM (1)	HISTORY OF FILM (2)	HISTORY OF JAZZ (1)	HISTORY OF JAZZ (2)	ETHNIC AMERICA
3:30		CONSUMER ECONOMICS FOR TEENAGERS; TEACHER INSERVICE	REHABILITATIVE NURSING	PHYSICAL ASSESSMENT AND HISTORY TAKING (1)	OCEANUS	PHYSICAL ASSESSMENT AND HISTORY TAKING (2)	ART OF BEING HUMAN
4:30		QUALITY OF LIFE	QUALITY OF LIFE	QUALITY OF LIFE	QUALITY OF LIFE	QUALITY OF LIFE	INTRODUCTION TO PSYCHOLOGY
5:00		VALUES, TECHNOLOGY AND SOCIETY	VALUES, TECHNOLOGY AND SOCIETY	VALUES, TECHNOLOGY AND SOCIETY	VALUES, TECHNOLOGY AND SOCIETY	VALUES, TECHNOLOGY AND SOCIETY	
5:30							
6:00		PERSONAL FINANCE	MAKING IT COUNT	PERSONAL FINANCE	MAKING IT COUNT	HOME GARDENER	
6:30		VOYAGE	VOYAGE	VOYAGE	VOYAGE	CAREER CONVERSATION	
7:00		OCEANUS	UNDERSTANDING HUMAN BEHAVIOR	PERSONAL FINANCE	UNDERSTANDING HUMAN BEHAVIOR	MAKING IT COUNT	
7:30		OCEANUS	UNDERSTANDING HUMAN BEHAVIOR	PERSONAL FINANCE	UNDERSTANDING HUMAN BEHAVIOR	MAKING IT COUNT	
8:00		WRITING SKILLS	WRITING SKILLS	WRITING SKILLS	WRITING SKILLS	GROWING YEARS	
8:30		BUSINESS ENGLISH	BUSINESS ENGLISH	BUSINESS ENGLISH	BUSINESS ENGLISH	GROWING YEARS	
9:00		HOME GARDENER	GROWING YEARS	OCEANUS	MAKING IT COUNT	PERSONAL FINANCE	
9:30		HOME GARDENER	GROWING YEARS	OCEANUS	MAKING IT COUNT	PERSONAL FINANCE	
10:00		DC LECTURE	DC LECTURE	DC LECTURE	CONTEMPORARY HEALTH	FOOTSTEPS	
10:30		DC LAB	DC LAB	DC LAB	CONTEMPORARY HEALTH	FOOTSTEPS	

APPENDIX D

A SAMPLING OF CURRENTLY AVAILABLE TV COURSES

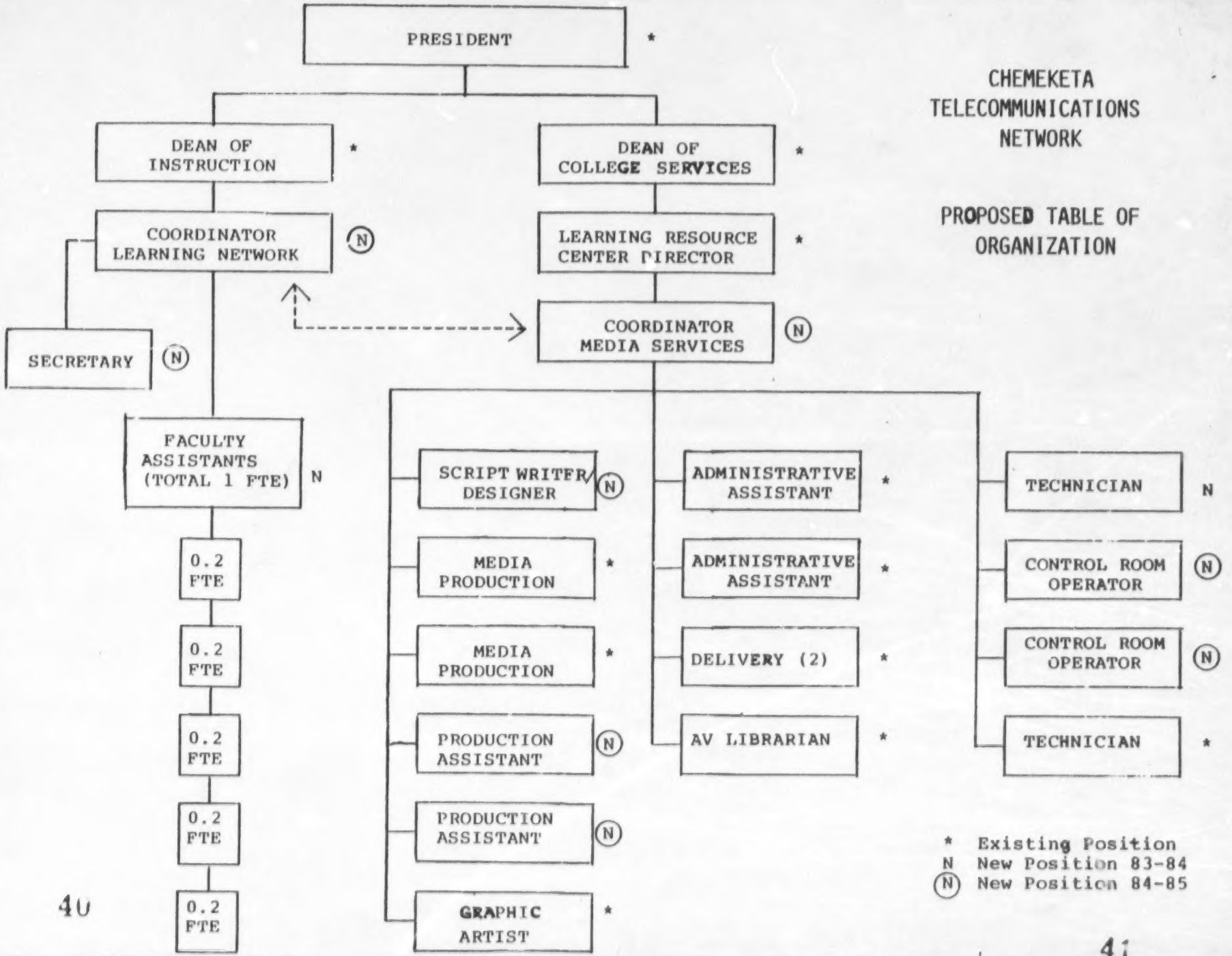
PBS Adult Learning Service
Accounting: University of Mid-America
Age of Uncertainty
Agriculture 2000
America: The Second Century
American Business History
American Government Survey
American Short Story
The American Story
The Art Of Being Human
As Man Behaves
Basic Electricity - D.C.
Basic Electricity and DC Circuits
The Body In Question
Botanic Man (Biology)
Business English
The Business Of Management
Case Studies In Small Business
Communicating Through Literature
Contemporary Health Issues
Cosmos
Dimensions In Science: Physics
The Drama Of Child Development
Drama: Play, Performance, Perception
Earth, Sea, and Sky
Fast Forward
Focus On Society
Footsteps
Free To Choose
Guten Tag
Hablamos Espanol (Spanish)
Here's To Your Health
Home Gardener
Home Is Where The Care Is
In Our Own Image
Interaction
Introducing Biology
Introduction To Business
Shielded Metal Arc Welding
Ireland: A Television History
It's Everybody's Business
Jazz: An American Classic
Life On Earth
Look At Me
Survey of Alcohol Information
Machine Technology
Making It Count
Mathematics For Modern Living
Middletown
The Money Puzzle: Macroeconomics
Needlecraft
Oceanus - The Marine Environment
Odyssey
Oxyacetylene Welding
Personal Finance and Money Management
Sewing Power
The Shakespeare Plays 1978-1982
Survival Spanish
The Growing Years
Through The Genetic Maze
Transitions - Adults In Learning
Understanding Human Behavior
Understanding Space and Time
Challenge & Change in Career/Life Planning
Voyage of Darwin
Welding Set I, II, III
Writers' Workshop
You and The Law
Your Health, Your Choice

(Source: TV Course File, Tom Gill's Office)

APPENDIX E

CHEMEKETA TELECOMMUNICATIONS NETWORK

PROPOSED TABLE OF ORGANIZATION

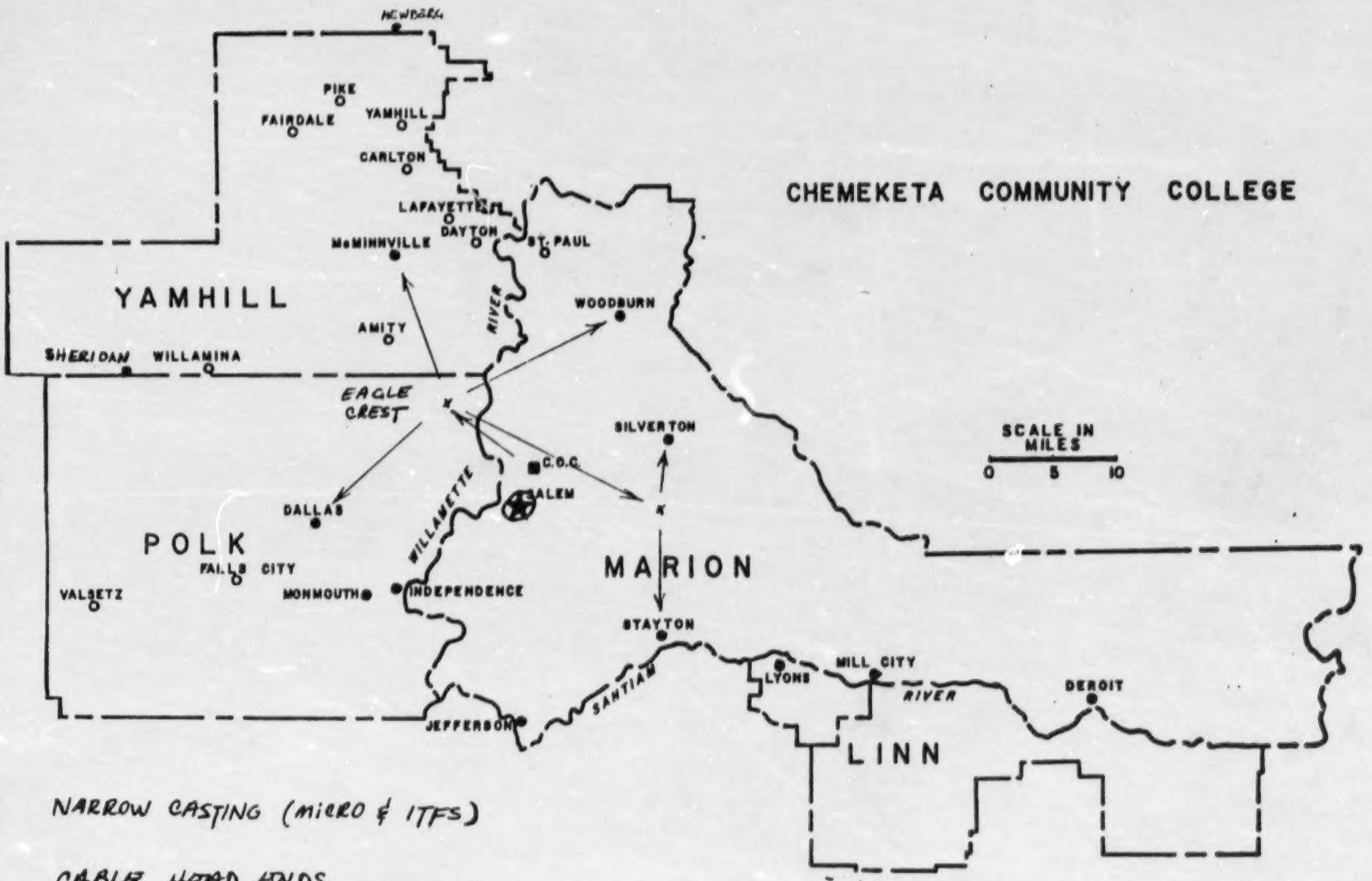


* Existing Position
N New Position 83-84
(N) New Position 84-85

APPENDIX F

CHEMEKETA TELECOMMUNICATIONS NETWORK
INITIAL AND PROJECTED OPERATING COSTS

	1983-84	1984-85	1985-86
PERSONNEL (NEW POSITIONS)			
Network Coordinator	12,500	25,000	26,500
Secretary		12,000	12,720
Designer/Scriptwriter		20,000	21,200
Technician	15,000	20,000	21,200
Cntrl. room (2)		28,000	29,680
Production Asst (2)		27,000	28,620
PERSONNEL (EXISTING POSITIONS)			
Production Supervisor	20,553	21,786	23,074
Production Specialist	25,593	27,129	28,757
A.V. Librarian	26,745	28,350	30,051
Technician	18,956	20,093	21,299
Administrative Asst.	14,309	15,168	16,078
Graphic Artist	14,560	15,434	16,360
Circulation Asst. (2)	22,039	23,361	24,763
SUBTOTAL:	170,255	283,320	332,326
FRINGES	59,589	99,162	116,314
TOTAL:	229,844	382,482	448,640
OPERATIONAL COSTS			
Personnel:			
Production personnel		12,000	13,200
Talent		4,000	4,400
Faculty Assistants	9,000	8,000	8,800
Producer release-time		15,000	16,500
Materials			
Production supplies (034)		18,000	19,800
Office supplies (021)		800	880
Postage (020)		6,000	6,600
Contract services (029)	15,875	40,000	44,000
Replacement (049)		25,000	27,500
Maintenance (033)		20,000	22,000
Travel			
Primary effort (022)		3,500	3,850
Departmental (023)		1,800	1,980
Phone			
Lease-lines (Phone-Net)		3,600	3,960
Leased equipment		400	440
Long-distance (042)		2,500	2,750
Periodicals, fees, dues		1,500	1,650
TOTAL OPERATIONAL COSTS:	24,875	162,100	178,310
EQUIPMENT COSTS	420,000	30,000	0
GRAND TOTAL	674,719	574,582	626,950



CHEMEKETA COMMUNITY COLLEGE

NARROW CASTING (MICRO & ITFS)

CABLE HEAD ENDS

32 ERIC Clearinghouse for Junior Colleges NOV 4 1983